USER MANUAL

Multiple Sclerosis Patient Application

Telemedicine Final Project – December 2024

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1. General Information

1.1 Application overview

The application, Multiple Sclerosis Patient, is designed to help patients with this condition maintain a clear and continuous record of health data, and therefore monitor their disease. This is achieved by allowing patients to record ECG (Electrocardiogram) and EMG (Electromyogram) signals using a BITalino device, along with documenting their symptoms.

All information submitted by the patients is securely stored in a database managed by the server. Doctors have access to a dedicated application that enables them to review their patients' health records, analyze the data, and send feedback messages, ensuring continuous communication with their patients.

2. Application features

2.2 Server Connection

2.2.1 IP Address
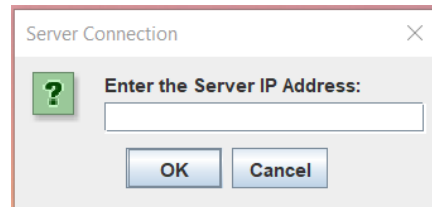
The initial IP address configured is" localhost"

Figure 1. Server connection (IP Address)

2.2.2 Server Port

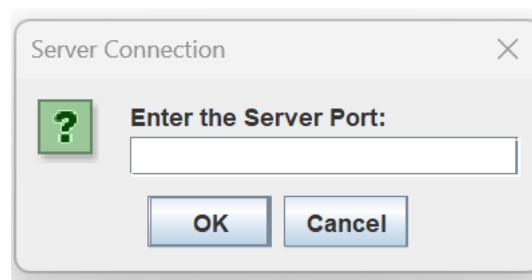The initial port for patients' access is" 9000"

Figure 2. Server connection (Port)

2.3 Home Screen

Upon launching the application, the home screen provides two primary options: Sign Up and Log In.
Click on the "Sign Up" button if you do not have an account and want to create one.
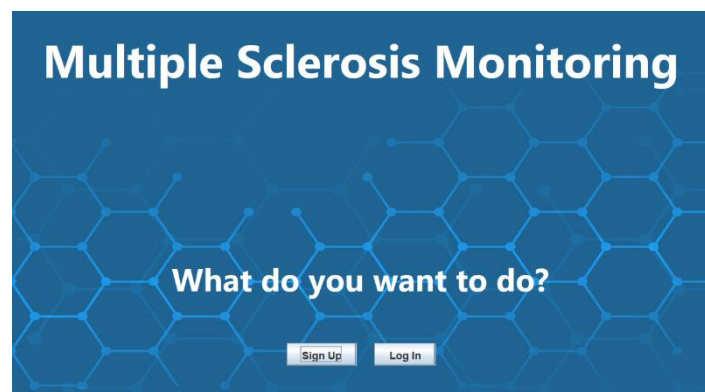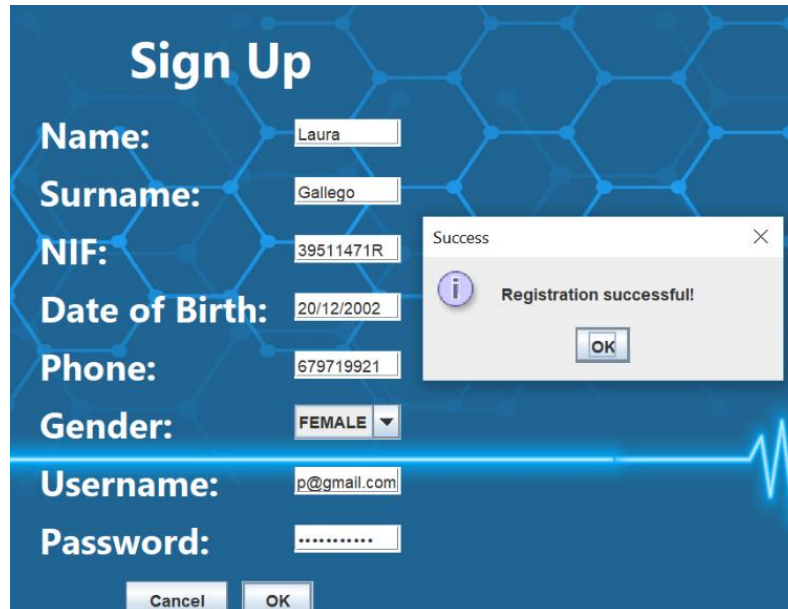Click on the "Log In" button if you already have an account and want to log in.
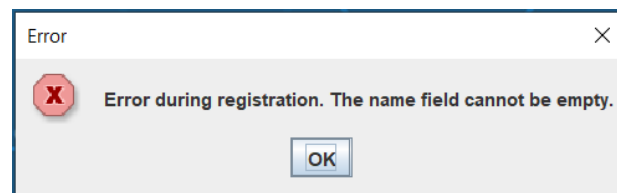

Figure 3. Home Screen

2.3.1 Sign up

3. In order to sign up and create an account in the app, the user must fill out the form displayed in the screen with accurate information (full name, surname, NIF, date of birth, phone number, gender, username, and password). All fields must be filled out as the pattern is expected, otherwise an alert will pop up on the screen. Once the details are completed, click OK to finalize the registration.

Figure 4. Sign Up

All fields must be filled out, otherwise an alert will pop up on the screen.

Figure 5. Empty Field Alert

3.2.1 Log in

The Patients who have already registered can now log in by selecting Log In from the home screen, entering their registered username and password, and clicking OK. If incorrect credentials are entered, an error message will appear.
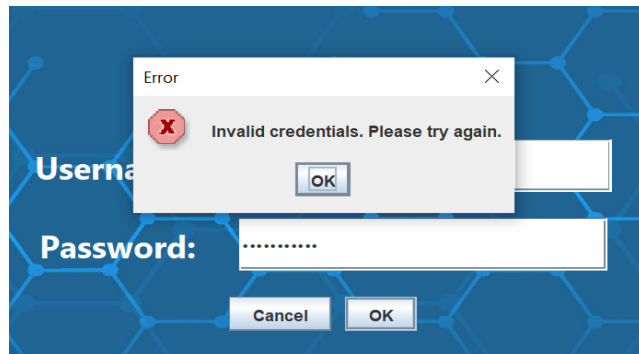
Figure 6. Error Invalid Credentials for Patient
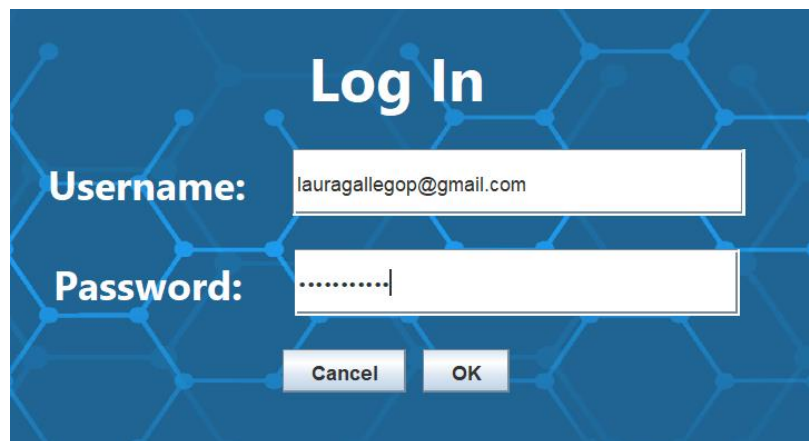
Figure 7. Log in successful for patient

3.3 Patient dashboard

Once logged in, the system provides several features, including viewing personal details, accessing assigned doctor information, starting a monitoring session, reviewing previous reports, modifying settings, or logging out.

Figure 8. Patient dashboard

2.2.1 View My Information

To view all the personal information, the patient can click on the "View My Information". This action will display the patient's name, DNI, date of Birth, gender and phone number, providing you with quick access to verify your personal information.

Figure 9. View personal information

2.2.2 View Doctor assigned

To see the doctor assigned to the patients assigned to each doctor, we can click at the "View Doctor Information" button to see the doctor assigned name, surname and specialty.
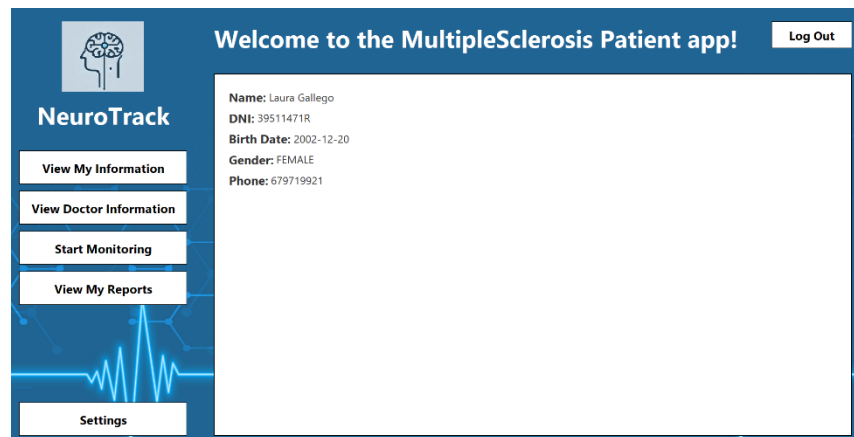

Figure 10. View doctor assigned information

2.2.3 Start Monitoring

To monitor your physiological parameters and report symptoms, select Start Monitoring from the dashboard. The application will display a welcome message before initiating the session. Ensure your BITalino device is connected to the application via Bluetooth to record ECG and EMG signals accurately.
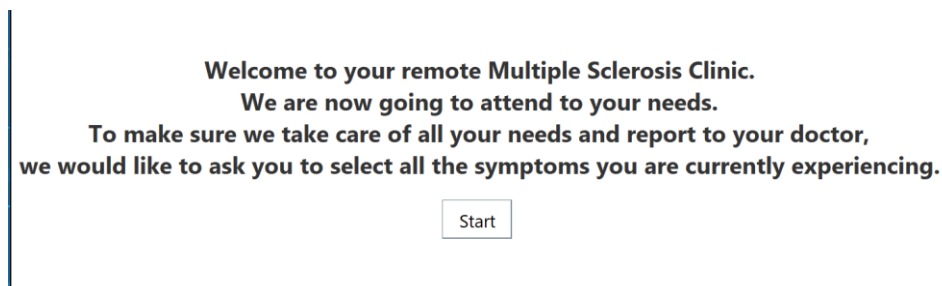

Figure 11. Welcome message

2.2.3.1   Indicate Symptoms

The application will ask you to select symptoms you are currently experiencing from a predefined list to report to your doctor.

Select all the symptoms you are currently experiencing:

☐ Loss of balance	☐ Muscle spasm	☐ Numbness or abnormal sensation in any a…
☐ Trouble moving arms and legs	☐ Difficulty walking	☐ Problems with coordination and making s…
☐ Tremor in one or both arms or legs	☐ Weakness in one or both arms or legs	☐ Constipation and stool leakage
☐ Difficulty starting to urinate	☐ Frequent need to urinate	☐ Intense urgency to urinate
☐ Urine leakage (incontinence)	☐ Facial pain	☐ Painful muscle spasms
☐ Tingling, itching, or burning sensation in a…	☐ Reduced attention span, ability to discern,…	☐ Difficulty with reasoning and problem-sol…
☐ Depression or feelings of sadness	☐ Dizziness or loss of balance	☐ Hearing loss
☐ Erectile problems	☐ Problems with vaginal lubrication	☐ Poorly articulated or difficult-to-understa…
☐ Trouble chewing and swallowing		

Back   Next

Figure 12. Symptoms list

2.2.3.2   EMG Monitoring Instructions

Once you start monitoring, you will first perform an EMG to measure muscle activity. Follow the on-screen instructions carefully to place the electrodes:

- RED electrode: Place on the center of the biceps muscle.

- WHITE electrode: Place 2-3 cm along the muscle, aligned with the muscle fibers.

- BLACK electrode: Place on a bony area such as the elbow or wrist.

After placing the electrodes correctly, press the **"Play"** button to start recording the EMG data.

EMG Instructions
Now we will perform an EMG.
1. Place the **RED** electrode on the center of the biceps muscle.
2. Place the WHITE electrode 2–3 cm along the muscle, aligned with fibers.
3. Place the **BLACK** electrode on a bony area like the elbow or wrist.

Once everything is ready, press PLAY.

Play

Figure 13. EMG Instructions

If the device is not detected, an error message will notify you. Ensure that the BITalino device is properly connected via Bluetooth and powered on.
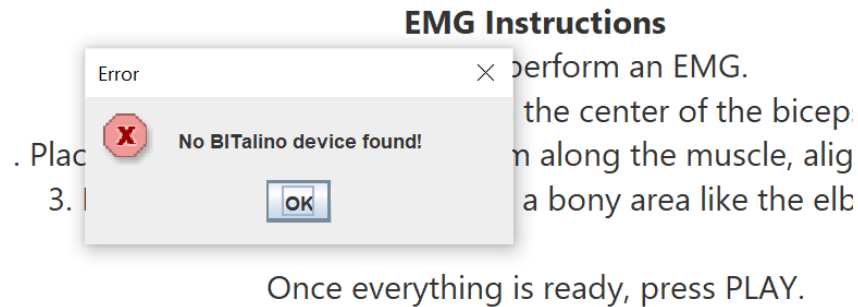

Figure 14. Device is not connected error.

Once the EMG recording is successful, a confirmation message will appear, stating that the data has been recorded successfully.
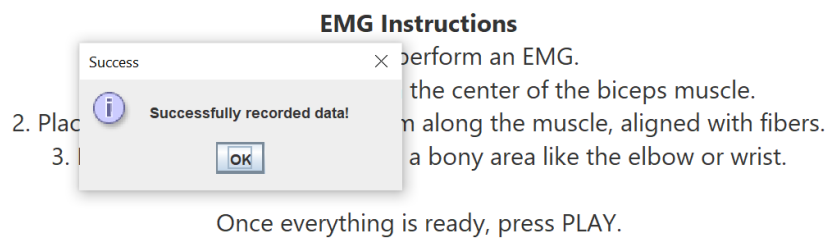

Figure 15. EMG recording successful messages.

2.2.3.3   ECG Monitoring Instructions

After completing the EMG monitoring, you will proceed to record your ECG signals, which track heart activity. Follow the on-screen instructions carefully to place the electrodes:

- RED electrode: Place below the right clavicle.

- WHITE electrode: Place on the lower left side of the torso.

- BLACK electrode: Place on the right side of the torso.

Once the electrodes are placed correctly, press the **"Play"** button to begin the recording.

ECG Instructions
Follow these steps to record an ECG:
1. Place the **RED** electrode below the right clavicle.
2. Place the WHITE electrode on the lower left side of the torso.
3. Place the **BLACK** electrode on the right side of the torso.

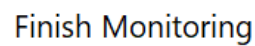Once everything is ready, press PLAY

Play

Figure 16. ECG Instructions

If the device is not detected, an error message will notify you. Ensure that the BITalino device is properly connected via Bluetooth and powered on. Once the EMG recording is successful, a confirmation message will appear, stating that the data has been recorded successfully.

Once both EMG and ECG data have been recorded, press the **"Finish Monitoring"** button. The system will automatically upload the recorded physiological data to the server, ensuring secure transmission to your assigned doctor for analysis.

Back   Finish Monitoring

Figure 17. Finish monitoring button

Monitoring Complete
All the information has been sent to your doctor.
A report will be sent to you as soon as possible.
Thank you for your cooperation!

Done

Figure 18. Finish monitoring button

2.4.4. View Feedback

To view the feedback, patients will find a list of feedback messages organized by date. By clicking on a specific date, they can access the detailed feedback provided by their doctor. Each feedback entry displays the name of the doctor, the date of the feedback, and the associated message. This feature allows patients to stay informed about their health progress and receive guidance for further actions or treatment adjustments.

Figure 19. Feedback of the patient

2.4.5 Settings

The settings section of the application provides patients with options to manage their personal information and security preferences efficiently. This section allows users to update their personal details, this feature ensures that the patient's data remains accurate and up to date for effective communication and monitoring.

Additionally, patients can enhance the security of their accounts by updating their passwords. The patient can input a new password and confirm it. After saving the new password, the system ensures the account's security by preventing unauthorized access.

Figure 20. Settings of the doctor

Name:	Laura	New Password:	
Surname:	Gallego	Confirm Password:	
DNI:	39511471R		
Birth Date (YYYY-MM-DD):	2002-12-20		
Phone:	679719921		

Cancel   Save New Password

Figure 21. Update personal information   *Figure 22. Update password*

2.4.5 Log out

Finally, when a patient decides to log out of the application, a confirmation dialog appears, this ensures that the decision to log out is intentional, preventing accidental disconnection. Once the action is confirmed, the application securely ends the user's session, protecting the patient's account and ensuring the confidentiality of their data.
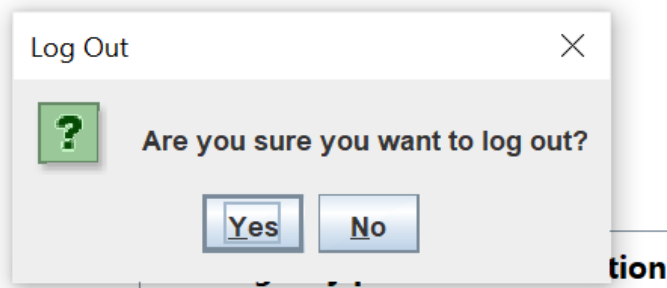
Log Out   ✕

? Are you sure you want to log out?

Yes   No

tion

Figure 23. Log out